

Editorial

B Sury, Editor

Pólya was one of the giants of 20th century mathematics. Apart from his vast mathematical contributions, Pólya came to be regarded as the father of teaching problem-solving as a way to inculcate mathematical ability. The Article-in-a-Box has a precis of Pólya's contribution to this topic; a more detailed summary appears in Shailesh Shirali's piece. Pólya believed the prime aspect of 'doing mathematics' is problem-solving which he believed could be taught. He wrote an article in 1963 which was titled 'Learning, Teaching, and Learning Teaching'. Sometimes, he signed his name as 'G.P.' impishly adding in parentheses 'Guessing and Proving'. The last-mentioned phrase reminds me of a question that a colleague once asked of a well-known contemporary mathematician. When asked whether a certain assertion was true, he came the reply: "Yes, of course, it is true; only, someone needs to prove it"!

The Right To Education (RTE) act came into effect exactly four years ago but the problems faced in implementing school education and, particularly, mathematics education remain. High school mathematics education in our country has been beset with problems due to complex issues. Many children drop out of school due to failing in one subject – mathematics. One reason is that most school mathematics education continues the unproductive method of just following and reproducing what is done by the teacher in class. Instead, a conscious effort to inculcate and nurture the use of heuristics, problem-solving, reasoning and analogy is desirable. The board examinations at the end of high school are faced with fear as they are viewed as the one crucial, pivotal moment paving the path towards all future prospects. These exams have become more a matter of pattern recognition rather than being indicative of any mathematical ability of students who do well in these board (mathematics) examinations.



Email: surybang@gmail.com

The cover displays George Pólya's illustrative tiling of the plane corresponding to the seventeen wallpaper groups. This particular chart had a great influence on the Dutch artist M C Escher.

At the undergraduate level, the number of good mathematics teachers is insufficient. The few elite institutions in the country have not contributed enough to right this malaise which is at a more basic level. Overcoming rigid attitudes regarding curricula and modes of assessment in college education and creating a healthier atmosphere for teachers to improve their skills is a major challenge. If this can be done, one could think of fruitfully adopting methods of teaching as advocated by Pólya.

In this volume, Shobha Madan describes Pólya's deep contributions to complex analysis. There is a beautiful review by Shailesh Shirali of some of Pólya's books and articles on learning and teaching mathematics. An interesting article by M K Raghavendra and V Venkataraman which gives an inexpensive way to build a charge meter and a description of some simple electrostatic experiments which may be done with it, should be very useful to teachers. The work on development of multi-scale models for complex chemical systems which won the Nobel Prize in Chemistry for 2013 is discussed by Saraswathi Vishveshwara. Finally, there is a captivating treatment of ecology from a physicist's perspective. This is the first of a series of articles which seek to emphasize that theory and mathematics have been central to ecology since the inception of this relatively young scientific field.

